Sustainability Fee Project Grant Report Guidelines
for grants awarded during FY2019
Due by 5pm August 1, 2019
Email pdf or word doc to cfs@georgiasouthern.edu

Please provide the following information in order to help the Center for Sustainability document the success of the Sustainability Fee Grant Program.

Date: 8/9/19
Name(s): John Carroll
Unit/Department(s): COSM/Biology
E-mail address: jcarroll@georgiasouthern.edu
Phone: 84587
Project title: Is one man's trash an oyster's treasure?
Amount granted: $17,103
Amount spent: $13,524

I. Project Outcomes/Value

Project Timeline - Is your project *completed* or still *in progress*?
Completed

Project Outcomes –
The number of new buildings and remodel projects on campus has been increasing to improve the quality of the student existence here at Georgia Southern. However, these construction projects often produce considerable waste which is typically sent to landfills. Waste Reduction is a major priority for the Georgia Southern's Sustainability efforts, and those typically involve recycling of paper, plastic and aluminum, along with some other materials. It is possible that some of the debris created by our multiple construction projects can also be recycled or reused, which would significantly reduce the amount of waste produced by our campus. This proposed project would explore one potential use for construction debris to help restore coastal habitats and protect our coastline by monitoring oyster recruitment and community development. These efforts will coincide with a structured education and outreach component that includes student involvement in monitoring, student opportunities to participate in restoration activities, visual displays with live organisms at Green Fest and No Impact Week, pamphlets, and an active online presence with a website and through social media. The short-term benefit of the proposed project is determining whether some construction debris could be used for oyster habitat restoration along the coast. If we can demonstrate this, the long-term benefits are a dramatic reduction in waste reaching landfills generated during on-campus construction projects, and cost-savings associated with reduced waste.

Over 1 year, we investigated whether oyster recruitment and reef community development was affected by the substrate used. We compared concrete and brick substrate to oyster shell substrate by filling trays with the different substrates and deploying them for 1 and 3 month intervals. Interestingly, there were more crabs on trays with brick than with oyster shell, likely due to increased structural complexity created by the brick pieces. There were no differences in the number of oyster spat per tray. The results suggested that we could potentially use construction debris in oyster reef restoration projects. These results were presented at No Impact Week, and we printed out pamphlets to distribute at No Impact Week and the Sustainability Showcase. We ran out of materials for the last collection –

while we were provided with concrete and bricks from maintenance, we eventually ran out of materials to fill our trays. Additionally, the high wave energy at our selected study site – Priest Landing – caused some trays to become dislodged and we lost 2 trays during the course of the survey.

Sustainability Improvements – We targeted the sustainability themes of **Waste Reduction** and **Biodiversity**. Although the project was conducted off campus, improvements can be measured by engagement with students on campus. The grant employed 1 graduate and 2 undergraduates, but also helped cover transportation costs for 24 students to participate in an oyster reef restoration project in South Carolina. Additionally, numerous students were engaged at the No Impact Week table and our booth at the Sustainability Showcase.

Outreach – My graduate student Jess participated in both Green Fest in downtown Statesboro – to explain the importance of oysters to the coastline, and also participated in No Impact Week on trash day. We created a poster to highlight the project as well as trifold pamphlets (attached). Both the poster and the pamphlets were on display/available to take at the No Impact Week as well as the Sustainability Showcase. In addition, the project PI's were able to take advantage of social media (Twitter: @JohnnyScallops, @JessWatts39, @GaSouthernBiol, @GSCOSM)

Budget report- The total amount awarded ($17,103) was higher than the ultimate amount spent ($13,524), with the remaining funds returned to the CfS. The majority of the budget was allocated to student salaries, which supported the work of one graduate and two undergraduates on this project. Most of the returned money was in the form of unused undergraduate salary, as students hired rarely put in the full time they were hired to work. Approximately 11% of the budget was used for materials and supplies, including money for fuel to the field site and fuel to transport students to the aforementioned oyster restoration project. Some of the supplies money will also be returned due to differences in price estimates (especially fuel) from the proposal to the implementation stage.

II. Student and Community Impact

Students played an important role in project implementation, as the project hired graduate and undergraduate students, who were primarily responsible for conducting the vast majority of the work under the supervision of the PI.

#Undergraduate students employed by the grant, and length of employment (# hours/week for x weeks)
2 undergraduates were hired to work on the project, and they put in a combined 121 hours.

#Graduate students employed by the grant, and length of employment (# hours/week for x weeks)
1 graduate student was employed by the grant over the length of the project (Fall/Spring 18/19)

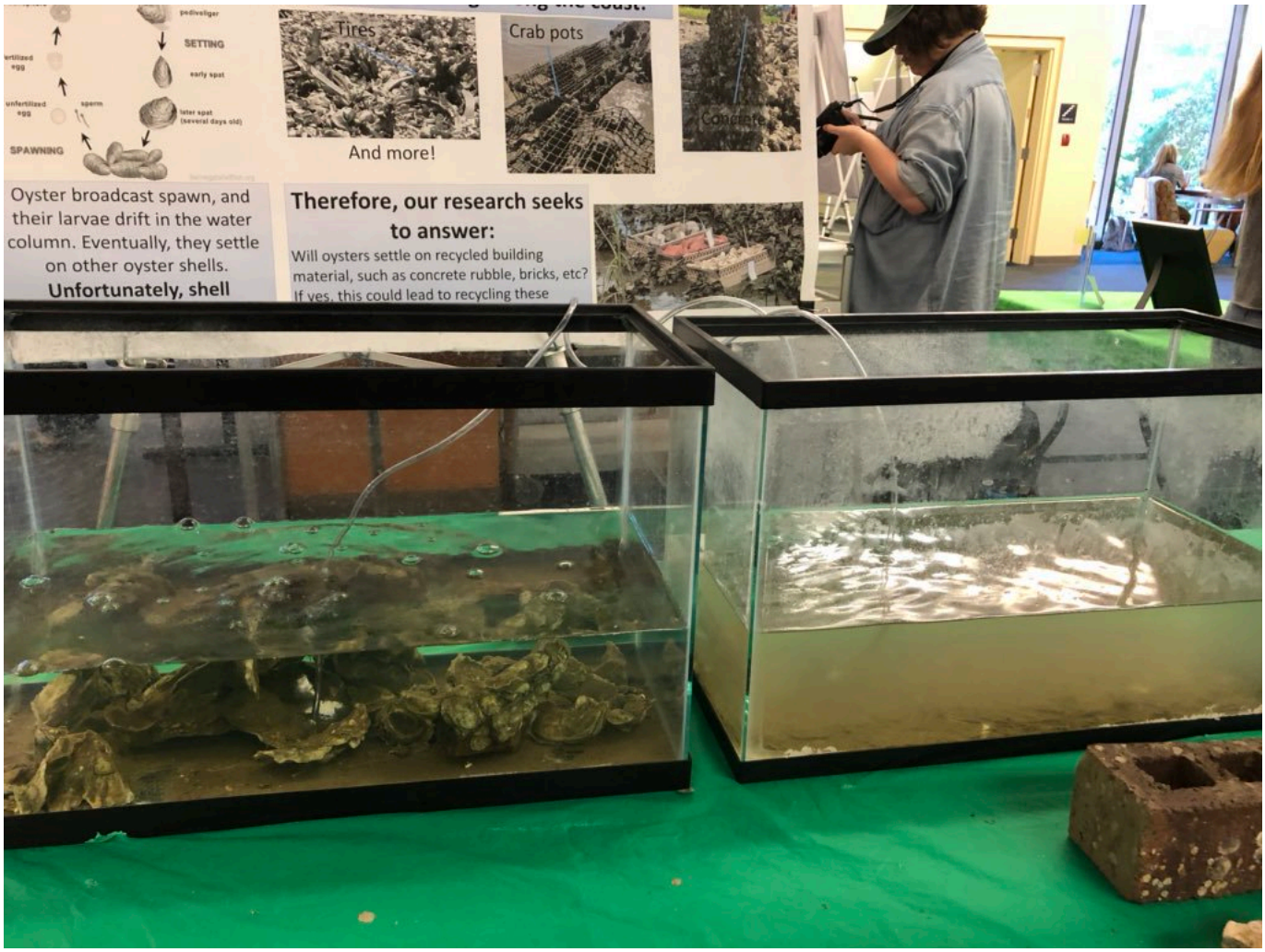
volunteers involved in the project, including total # of volunteer hours
24 student volunteers participated in an oyster restoration project with the South Carolina DNR, where they built an oyster reef and learned about their importance. Additionally, 7 other students volunteered time to participate in the field sampling portion of the project

students reached through classes or other means
We estimate that >25 students visited our interactive display at No Impact Week Trash Day activities, and we anticipate that >50 attendees viewed our display at the Sustainability Showcase in the Library. We distributed almost 80 pamphlets total at both events

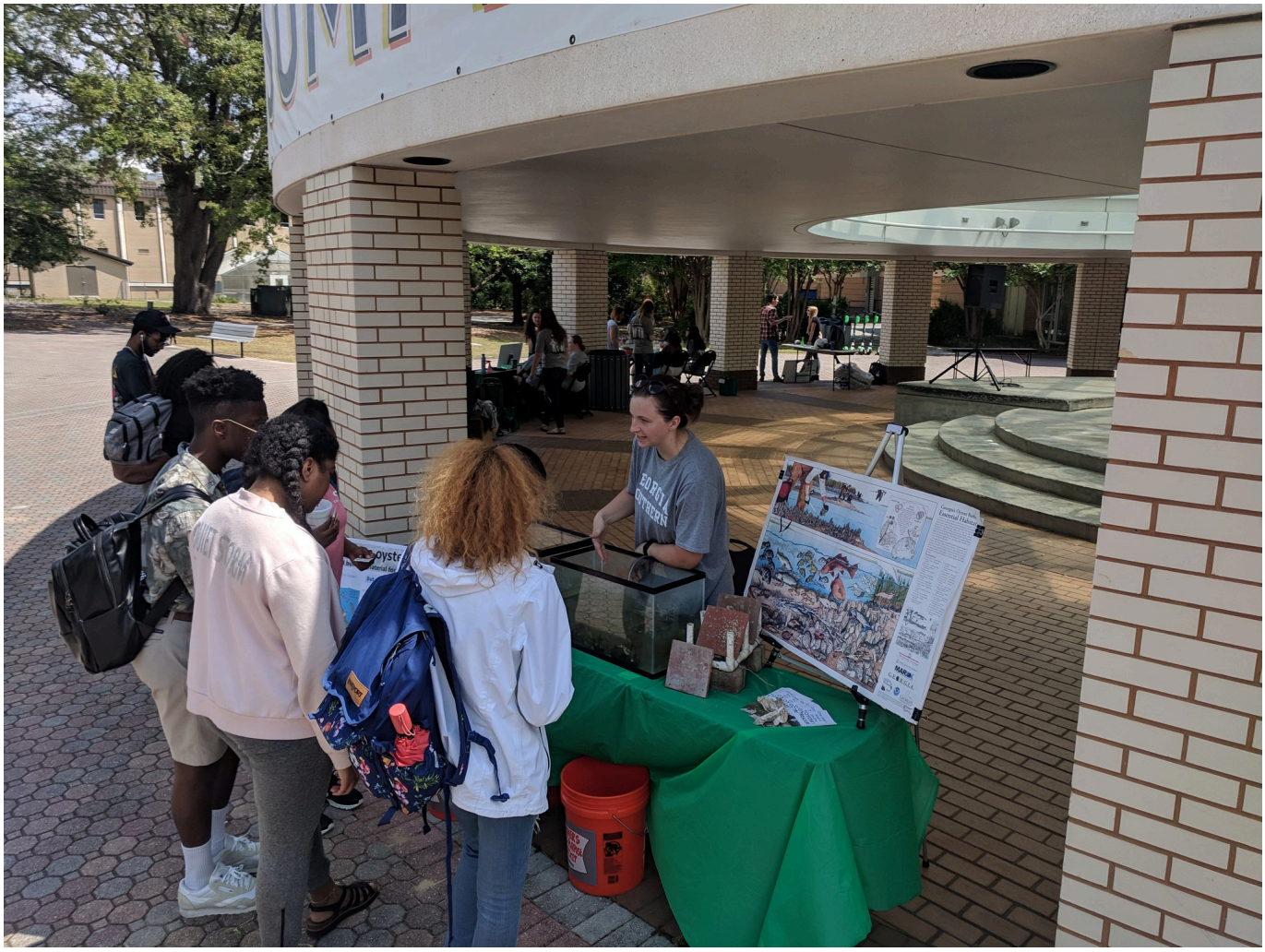
community members reached
We estimate that ~100 members of the community were engaged in our interactive display at GreenFest in the fall.

Grant Leverage
NA

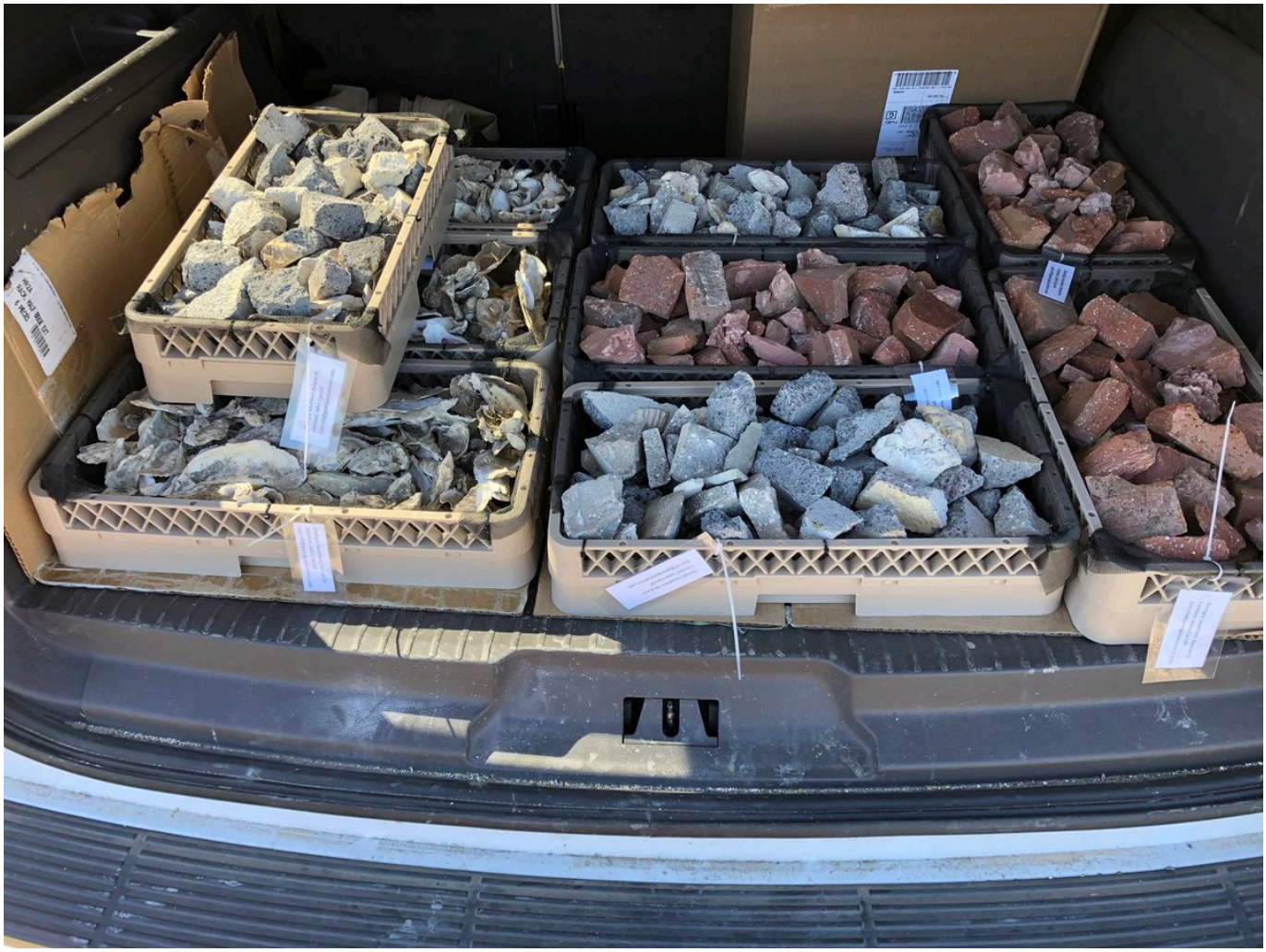
Project abstract
New building construction and remodeling of existing buildings produces considerable construction debris waste, which is typically disposed of in landfills. There may be ways to recycle some of these materials, such as bricks, concrete, porcelain and pallets, including for coastal restoration. Oysters are an important coastal habitat forming species which recruit to hard substrates. Unfortunately, oysters are substrate limited in coastal Georgia. We investigated how some construction debris, particularly crushed bricks and crushed concrete, compared to traditional, natural materials (oyster shell). We deployed trays filled with either construction debris or shells to a field site at Priest Landing, on Skidaway Island, Savannah, Georgia. Two sets of trays were deployed – one set was collected monthly, and other set was collected every 3 months. We found no differences in oyster spat recruitment to the debris or shells – although overall recruitment was generally low (1-2 spat per piece of debris/shell). Interestingly, our trays with bricks seemed to support higher densities of associated fauna, particularly crabs, likely due to the higher complexity of the brick debris compared to the shell. This research suggests a potential way to recycle construction debris materials, although more work is required before management agencies can use debris in restoration projects.



Display showing the effects of oysters on water quality – tank on the right had no oysters, tank on the left had the same water, but also oysters.



Students being engaged at our display during no impact week. Graduate student Jessica Watts is explaining the benefits of oysters.



Trays of materials.

Students participating in oyster reef